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Publication date:
2012

CentER

Discussion paper

BANK OWNERSHIP AND CREDIT OVER THE BUSINESS CYCLE: IS LENDING BY STATE BANKS LESS PROCYCLICAL?

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June 20, 2012

European Banking Center Discussion Paper
No. 2012-013

This is also a CentER Discussion Paper
No. 2012-049

ISSN 0924-7815

Bank ownership and credit over the business cycle: Is lending by state banks less procyclical?[1]

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Abstract: This paper finds that lending by state banks is less procyclical than lending by private banks, especially in countries with good governance. Lending by state banks in high income countries is even countercyclical. On the liability side, state banks expand potentially unstable non-deposit liabilities relatively little during booms, especially in countries with good governance. Public banks also report loan non-performance more evenly over the business cycle. Overall our results suggest that state banks can play a useful role in stabilizing credit over the business cycle as well as during periods of financial instability. However, the track record of state banks in credit allocation remains quite poor, questioning the wisdom of using state banks as a short term counter-cyclical tool.

Key words: state banks, lending, procyclicality
JEL Classification: G21, H44

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1. Introduction

During the recent global financial crisis, several countries were forced to nationalize failing private banks. Abn Amro in the Netherlands, for instance, is now fully owned by the Dutch government. As a result, the average share of government ownership of banks by bank assets has increased in high-income countries form 7.3% in 2007 to 10.8% in 2009, to fall back slightly to 9.9% in 2010. The increased prevalence of state banks is providing renewed impetus to the debate on the economic costs and benefits of state banking. While previous research has shown that state banks tend to perform badly, misallocate resources and lead to lower economic growth, relatively little is known about how state banks react to business cycle fluctuations. To fill this gap, this paper examines the lending behavior of state banks over the business cycle, and also fluctuations in the main types of bank funding that make this lending possible. In addition, this paper considers the relative accounting for non-performing loans by state banks, as differences in the reporting of bad loans over the business cycle by state and private banks are a potential mechanism to explain different capacities to provide new loans. Our analysis is based on a sample of 1633 banks from 111 countries over the 1999-2010 period.

We find that lending by state banks is less procyclical than the lending by private banks, especially if the bank is located in a country with good governance. We capture good governance by an index of government effectiveness, which increases with perceptions of the quality of public services, the degree of independence from political pressures and the credibility of a government's commitment to its own effectiveness. Moreover, lending by state banks located in high-income countries is even countercyclical. State banks also expand their credit relatively more during banking crises, which points at a stabilizing influence of state banks at a time of financial instability. Among private banks, we find that foreign-owned banks' lending is

especially procyclical, perhaps because these banks have ready access to funding from their international parent firms to take advantage of local lending opportunities during economic upswings.

On the liability side, state banks increase their non-deposit liabilities relatively little during booms, especially if these banks are located in countries with good governance. Since non-deposit liabilities tend to be less stable than deposits, private banks' increased reliance on them during economic booms potentially puts these banks at risk during downturns. Private banks also report relatively higher loan quality during economic expansions, increasing their ability to ramp up new lending during upswings compared to state banks. In contrast, state banks report loan quality more evenly over the business cycle. Hence during recessions, state banks are able to maintain higher rates of loan growth, as they are able to achieve higher rates of growth of non-deposit funding and report lower increases in the growth rate of non-performing loans.

Overall our results suggest that state banks can play a useful role in stabilizing credit over the business cycle as well as during periods of financial instability. However, the track record of state banks in credit allocation remains quite poor, questioning the wisdom of using state banks as a short term counter-cyclical tool. For this purpose, alternative policy tools in the form of macroprudential bank regulation, including procyclical capital requirements and monetary policy are more appropriate, as they are more flexible than state ownership of banking and would not lead to credit misallocation resulting in low economic growth.[2]

There is a substantial literature on the impact of state ownership of banks on banking performance and economic outcomes. A large number of cross-country studies show that state ownership of banking is associated with low bank efficiency and lower levels of financial

[2] For an analysis of countercyclical bank regulation in Basel III, see Repullo and Saurina (2011).

development (Barth, Caprio and Levine, 2001, 2004, La Porta, Lopez-de-Silanes and Shleifer, 2002). State bank ownership lowers banking sector outreach (Beck, Demirguc-Kunt and Martinez Peria, 2007), and leads to wider intermediation spreads and slower economic growth as well as greater financial instability (La Porta, Lopez-de-Silanes and Shleifer, 2002; Caprio and Martinez Peria, 2002). Dinc (2005) shows that state bank lending is politically motivated, since state banks in emerging markets increase their lending relative to private banks in election years.

Banking outcomes also worsen with state ownership. For example, Mian (2003) finds that state-owned banks report higher loan loss provisioning and achieve lower profitability than private banks using data for a large set of emerging economies. Micco, Panizza and Yanez (2007) report that state-owned banks located in developing countries tend to have lower profitability and higher costs than their private counterparts. Cornett et al. (2010) find that state-owned banks in 16 Asian countries operated less profitably and had greater credit risk than privately-owned bank prior to 2001, although this performance gap was largely closed after the Asian financial crisis.

Individual country studies provide consistent results. Berger et al. (2005) find that the performance of state-owned banks in Argentina, for instance as measured by cost efficiency, was low in the 1990s, and improved considerably after privatization. Lin and Zhang (2009) find that the "Big Four" state-owned commercial banks in China are less profitable, are less efficient, and have worse asset quality than other types of banks that involve some domestic or foreign private ownership. Importantly, country level studies also show that politicians use government bank lending to provide political patronage leading to significant credit misallocation (See for example Cole (2009) for India, Khwaja and Mian (2005) for Pakistan, Carvalho (2010) for Brazil, and Sapienza (2004) for Italy). Not only is state bank lending more politicized and inefficient, it in

addition generally does not serve the more credit constrained segments of the population, such as small and medium enterprises (Berger et al., 2008; Ongena and Sendeniz-Yuncu, 2011). Hence, there is an overwhelming amount of consistent literature suggesting that state ownership of banks lowers bank performance, with negative consequences for economic growth.

In contrast, the literature examining the lending behavior of state banks during business cycles is quite sparse with mixed results. Micco and Panizza (2006) relate bank credit growth to GDP growth and an interaction term of GDP growth and a state ownership variable for an international sample of banks over the 1995-2002 period finding that credit growth of state banks is less procyclical than for private banks. In contrast, using a sample of 210 Western European banks over the 2000-2009 period, Iannotta et al. (2011) do not find a statistically significant difference between state and private bank lending for the smaller European sample. Cull and Martinez Peria (2012) examine the impact of bank ownership on credit growth in a sample of Latin American and Eastern European developing countries before and after the global financial crisis, finding mixed results. They show that state banks in Latin America acted in a counter-cyclical fashion during the crisis, whereas those in Eastern Europe did not, hence emphasizing regional differences.

In this paper our approach is similar to Micco and Panizza (2006) and Iannotta et al. (2011), but unlike these two studies we control for possible endogeneity of GDP growth to credit growth by using system GMM estimation. In addition, we consider a large worldwide sample of banks for the recent period from 1999 to 2010, including the recent global banking crisis. Furthermore, unlike previous papers we consider the dynamics of the main categories of bank funding and of the accounting for non-performing loans and loan loss provisioning to better understand the various 'channels' that influence state bank lending over the business cycle. Finally, we also

examine differences in lending behavior among domestic private banks versus foreign banks for a large number of countries.

The remainder of this paper is organized as follows. Section 2 discusses the data including our bank ownership classification. Section 3 presents the econometric methodology, and the empirical results. Section 4 concludes.

2. Data

The empirical analysis is based on an international sample of 1633 banks from 111 countries for the period 1999-2010. See Table A1 in the Appendix for details on the number of banks per country. The main data source is Bureau van Dijk's Bankscope which provides information on statements of banks and their ownership structure.[3] To create time series information on the ownership of banks, we used Bankscope CDs starting from 1999 and Wharton Research Data Services (WRDS) for recent years. The CDs include snapshots of ownership structures in relevant years. In addition, we use various websites to classify the owner as private or state including Bankscope's online database, Factiva, Banker's Almanac and company websites of the banks. In our sample, we only include banks that we can identify to be owned by another entity with a 50% percent or higher ownership share. Thus, a bank is categorized as a state bank if it is majority-owned by a state-owned entity.[4]

Figure 1 illustrates the development of the average share of state ownership by bank assets. Specifically, the figure plots the average state ownership share for all countries, and separately for the groups of developing countries (and emerging markets), and high-income countries. The

[3] For all banks, we consider the financial statements at the highest level of consolidation within a country to avoid duplication of the data.
[4] Alternatively, La Porta et al. (2002) and Cornett et al. (2010) use a 20% government ownership threshold to identify state banks yielding comparable data.

average state ownership share in each instance is the weighted average of the shares of bank assets owned by state banks in pertinent countries, with the weights reflecting the number of observations in these countries. During the last decades, the share of state ownership in developing countries has tended to decline, from 34.6% in 1999 to 19.4% in 2010. This decrease was especially pronounced during the years from 2007 to 2010. Average state ownership in high-income countries, instead, has increased somewhat from 7.9% in 1999 to 9.9% in 2010, with most of the increase occurring after 2007. Overall the state ownership share has been rather stable around 19%, although it declined from 17.5% in 2009 to 13.5% in 2010. These trend data suggest that government ownership of banks is likely to remain prevalent in future years. In the empirical work, as a robustness check we also consider a further breakdown of privately-owned banks into domestic and foreign banks.

Table 1 provides summary statistics for our sample of banks. The main variable of interest is the loans variable, which is the log of net loans in local currency and deflated using the national GDP deflator (see Table A2 in the Appendix for variable definitions and data sources). We consider several variables to represent the sources of bank funding: total liabilities, deposits, non-deposit liabilities, short-term funding, long-term liabilities, and equity. These variables are also constructed as the logs of amounts in local currency and deflated by the GDP deflator. To proxy for the cost of bank funding, we construct the net interest expense ratio as the log of one plus the bank's interest expenses over interest bearing liabilities net of the government T-Bill rate taken from IMF International Financial Statistics database (IFS, 2012). As indices of the quality of lending, we consider the loan loss provision and non-performing loans variables.

The state bank variable is a dummy variable that equals one if a bank has a majority state ownership share. In our sample, 11.4% of bank-year observations concern state-owned banks.

Privately owned banks can have domestic or foreign ownership. The domestic bank variable indicates majority private domestic ownership, while the foreign bank variable signals majority private foreign ownerships. Domestic and foreign banks constitute 52.8% and 35.8% of our observations.

To represent business cycles, we use per capita real income growth in percentages, with a mean value of 1.96%. The impact of state ownership on the procyclicality of banks lending possibly depends on the general effectiveness of the government bureaucracy, i.e. good governance. As a proxy of this, we use a composite indicator of the government effectiveness from the World Governance Indicators (WGI) database (Kaufmann et al., 2010), which includes perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures. This variable is reported on an annual basis only after 2001, limiting regressions that include this variable to the period 2002-2010.

We consider several bank-level control variables, all lagged one year. Among these, assets it the log of total assets in constant 2000 dollars to capture the impact of a bank's too-big-to-fail status. Equity is the ratio of equity to total assets, to control for bank soundness, averaging 10.6% in our sample. Cooperative bank, real estate and mortgage bank and savings banks are dummy variables that are one if a bank is in the pertinent bank category. The loans over assets variable represents the relative importance of lending in a bank's activities, with a mean of 0.540. Liquidity, constructed as the ratio of liquid assets to total assets, can be a measure of bank soundness and its ability to sustain its lending, as well as an indicator of inefficiency (since too much liquidity comes at the cost of bank intermediation). In addition, deposits over total liabilities is a measure of the stability of a bank's funding, since non-deposit funding tends to

flee quickly during periods of instability. In our sample the bulk of the funding source consists of deposits, with a share of 0.771.

We consider two macroeconomic controls from World Development Indicators (WDI, 2011) database. These are GDP per capita in thousands of constant 2000 dollars, and inflation measured as the percentage change in the GDP deflator. Finally, the bank crisis variable is a dummy variable signaling a country is experiencing a banking crisis (Laeven and Valencia, 2010).

3. Methodology and empirical results

In section 3.1, we describe the system GMM estimation that we apply to our empirical specifications. In section 3.2, we present our results regarding the relative procylicality of state banks regarding their lending, funding volumes and costs, and reporting of non-performing loans and loan loss provisioning. Section 3.3 reports some robustness checks on the relative procyclicality of lending by state banks.

3.1. Estimation methodology

Our empirical specifications take the form of Arellano-Bond dynamic equations as follows:

$$y_{i,j,t} = \alpha y_{i,j,t-1} + \beta' X_{i,j,t} + \eta_i + \theta_t + \varepsilon_{i,j,t}, \quad (1)$$

where $y_{i,j,t}$ is the dependent variable for bank i in country j in year t, $X_{i.j.t}$ is a set of explanatory variables, η_i is a bank fixed effect, θ_t is a time fixed effect and $\varepsilon_{i,j,t}$ is an error term. In a regression to test for the procyclicality of lending by state banks, for instance, the dependent variable is the loans variable, while the set of explanatory variables includes the growth rate of

per capita GDP and its interaction with the state bank variable. First differencing (1) serves to eliminate the bank fixed effect as follows:

$$y_{i,j,t} - y_{i,j,t-1} = \alpha\left(y_{i,j,t-1} - y_{i,j,t-2}\right) + \beta'\left(X_{i,j,t} - X_{i,j,t-1}\right) + \theta_t + \left(\varepsilon_{i,j,t} - \varepsilon_{i,j,t-1}\right) \quad (2)$$

We apply the system GMM estimator (Arellano and Bover, 1995; Blundell and Bond, 1998) jointly to (1) and (2) using lagged first differences as instruments.[5] We take all explanatory variables - except GDP per capita growth, the bank ownership variables, government effectiveness and relevant interaction terms - as predetermined, meaning that current values of these variables can be correlated with post and current error terms but not with future error terms. In addition, the error terms are assumed to be serially uncorrelated, and lagged first differences of right-hand side variables are assumed to be orthogonal to bank specific fixed-effects to obtain consistent GMM estimation. Furthermore, we use two-step GMM estimation and the Windmeijer (2005) correction, which adjusts the covariance matrix for finite samples to minimize the downward bias in standard errors.

We report two main tests to determine the appropriateness of our dynamic GMM estimations. The first test is the Hansen test of the overidentifying restrictions with as the null hypothesis that instruments are exogenous. If the null hypothesis is not rejected, the instruments are valid. A further test is the Arellano-Bond test for autocorrelation of the errors, with as a null hypothesis no autocorrelation in differenced residuals. Specifically, the second-order test in first differences tests for autocorrelation in levels.

[5] We do not use the first lag of levels and current first differences of endogenous variables as instruments, but include all other lags, to ensure the exogeneity of our instruments and to avoid having too many instruments reducing the power of overidentifying restrictions tests. The second lag of endogenous variables, specifically, is not correlated with the current error term, while the first lag is. The difference estimator applied only to (2) has several drawbacks. It only exploits the time series dimension of data as it uses first differences, and not the cross-sectional dimension. In addition the lagged variables become weak instruments if the explanatory variables are persistent over time deteriorating asymptotic properties (see Beck (2008)). For an application of system GMM estimation to economic growth regressions, see Levine, Loayza and Beck (2000).

3.2. Empirical results

We first examine the cyclicality of lending by state-owned banks relative to privately owned banks. To do this, we specify a regression where the dependent variable is the loans variable, and where the set of explanatory variables includes the growth rate of GDP per capita, the state bank variable, and an interaction of these two variables.[6] The coefficient on the growth rate of GDP per capita informs about the cyclicality of lending by private banks, while the sum of this coefficient and the coefficient on the interaction of GDP per capita growth and the state bank variable measures the cyclicality of lending by state banks.

Table 2 reports 4 regressions of the loans variable. Regression 2 differs from regression 1 in that it includes a larger set of bank variables as controls. Starting from regressions 1 and 2, regressions 3 and 4 in addition include the government effectiveness variable and a triple interaction of this variable with GDP per capita growth and the state bank variable. In all regressions, real GDP per capita growth enters with positive coefficients that are significant at the 1% level, indicating that lending by private banks is procyclical. Estimated coefficients vary between 0.017 and 0.020, suggesting that a 1% increase in per capita GDP growth is associated with 1.7-2.0% increase in credit growth. In regressions 1 and 2, the estimated coefficients for the interaction of GDP per capita growth and the state bank dummy are -0.013 and -0.014, respectively, and they are significant at 1%. Thus, an increase in GDP per capita growth by 1% is estimated to increase lending by state banks by 0.7% and 0.6%, which suggests that lending by state bank is procyclical but less so than for private banks.

[6] A lagged loans variable is included as a control variable yielding estimated coefficients that are close to unity. Most of these coefficients -and especially those greater than 1- are not statistically different from unity.

In regressions 3 and 4, the interaction of GDP per capita growth and the state bank variable obtain coefficients of -0.011 that are significant at 1%. The triple interaction variable obtains a negative coefficient of -0.005 in regression 3 that is significant at 5%, and a coefficient of -0.004 is regression 4 that is marginally insignificant with a p-value of 0.105. These negative coefficients suggest that state banks are even less pro-cyclical in countries with good governance. Based on regression 3, we infer that a 1% increase in GDP per capita growth causes a domestic bank to increase its lending by 1.7%, while a state bank in a country with average government effectiveness of 0.888 increases its lending by 0.156% (=0.017-0.011+(-0.005*0.888)). Thus, lending by a state bank in a country with average government effectiveness is procyclical, but far less so than for a private bank. Our estimated coefficients also imply that lending by state banks is countercyclical if the government effectiveness variable exceeds 1.2 (note that the maximum value of government effectiveness is 2.374 from Table 1).[7] The regressions also pass the AR(2) and Hansen OIR specification tests, indicating the validity of the instrumentation.[8]

Less procyclical or even countercyclical lending by state banks suggests that the funding of public banks and potentially also the cost of funding are relatively insensitive to the business cycle. Next, we examine which type of funding of state banks expands relatively less than that of the private banks during the upswing of the business cycle (and vice versa), and whether public banks are rewarded for the low procyclicality of their lending by relatively small increases in their funding costs during boom periods (and vice versa). The funding categories we consider, as found on the liability side of banks' balance sheets, are total liabilities, deposits and non-deposit

[7] Similar results are obtained if we include an election variable to control for the impact of the electoral cycle on bank lending as in Dinc (2005) (unreported).
[8] Results reported in Table 2 are robust to excluding countries with fewer than 5 banks or 20 observations (unreported).

liabilities, short-term funding and long-term liabilities, and equity. Our funding cost variable is the net interest expense ratio, defined as the log of interest expenses over total interest-bearing liabilities minus the government T-Bill rate. For each of these funding quantity and funding cost variables, we specify two regressions analogous to regressions 3 and 4 of Table 2. The results are reported in Table 3.

In several regressions in Table 3, we observe negative and significant coefficients on the interaction of GDP per capita growth and the state bank dummy, and/or on the triple interaction of these two variables and the government effectiveness variable, indicating that funding at state banks is less procyclical than at private banks. To start, in the total liabilities regressions 1 and 2, the interaction of GDP per capita growth and the state bank variable obtains negative coefficients of -0.007 and -0.008 that are significant at 5%, indicating that the growth rate of total liabilities of state banks is relatively low during economic booms. In the non-deposit liabilities regressions 5 and 6, the double and triple interactions obtain negative coefficients with significance of at least 10%, indicating that non-deposit liabilities that grow less at state banks during booms, especially if these banks are located in countries with high government effectiveness. Estimated coefficients in both regressions suggest that non-deposit liabilities at a state bank in a country with average government effectiveness are countercyclical. From regression 5, for instance, we see that a 1% increase in GDP per capita growth leads to reduction of non-deposit liabilities of -0.976% = (0.026-0.018-0.020*0.888). In the short-term funding regression 8, the interaction of GDP per capita growth and the state bank variable receives a negative coefficient of -0.006, suggesting that short-term funding at state banks is less procyclical. In the equity regressions 11 and 12, he triple interaction variable obtains negative coefficients of -0.007 and -0.008 that are significant at 5%. Parameter estimates imply that equity growth is less procyclical for state banks

in a country with average government effectiveness, while it is countercyclical in countries with government effectiveness exceeding 1.286. In the net interest expense ratio regressions 13 and 14, none of the interaction variables is statistically significant, suggesting that the funding costs are equally procyclical for private and state banks. In regression 14, the GDP per capita growth variable obtains a positive coefficient of 0.001 that is significant at 10% so that generally funding costs appear to be procyclical. The Hansen test of the overidentifying restriction is passed throughout Table 3, while the AR(2) test is also passed except in the equity regressions 11 and 12 where they are rejected at 5% and 10%, respectively.

Next, we consider whether private banks are able to expand their lending relatively more during booms, because they report higher loan quality during economic upswings. In particular, we consider the relative reporting on non-performing loans and loan loss provisioning by private and state banks over the business cycle. The non-performing loans variable is the dependent variable in regressions 1-4 of Table 4, while the loan loss provisioning variable is the dependent variable in regressions 5-8. In each instance, the 4 reported regressions differ in the number of included bank-level control variables and in whether government effectiveness and its interaction with GDP per capita growth and the state bank variable are included.

In the non-performing loans regressions 1-4, GDP per capita growth obtains a negative coefficient -0.003 that is significant at 1%, while its interaction with the state bank variable obtains positive coefficients of 0.002 with significance of at least 10%. Thus, the reporting of non-performing loans by state banks is less countercyclical. This could mean that the actual occurrence of non-performing loans at state banks is less countercyclical, or alternatively that state banks report loan non-performance more evenly over the business cycle. Analogously, in the loan loss provisioning regressions 5 and 6, the GDP per capita growth rate obtain negative

coefficients of -0.002 that are significant at 1%, while its interaction with the state bank variable obtains positive coefficients of 0.001 that are significant at 1%. Hence, reporting of loan loss provisioning by state banks appears less countercyclical, either because loan deterioration is less countercyclical at state banks or because the accounting for loan deterioration by state banks is relatively conservative during booms. In the latter interpretation, loan loss provisioning at private banks is overoptimistic during booms, perhaps to enable these banks to take full advantage of perceived lending opportunities during economic expansions. However, in regressions 7 and 8, the triple interaction of the GDP per capita growth, state bank, and government effectiveness variables obtains a negative coefficient of -0.010 that is significant at 1%. This suggests that loan loss provisioning at state banks becomes more countercyclical as government effectiveness increases, perhaps because state banks undertake additional loan loss provisioning during economic downturns in an environment of high government effectiveness. Overall, our results on the relative procylicality of loan loss provisioning by state banks are inconclusive. In the loan loss provisioning regressions 5 and 7, Hansen overidentification tests are rejected at 10% level, indicating the instruments are not valid. In the corresponding regressions 6 and 8 that include additional bank-level controls, however, these tests are passed.

3.3. Robustness checks on the procyclicality of lending

Private banks can be domestic or foreign-owned. Foreign-owned banks tend to be subsidiaries of international banks. This potentially enables them to obtain additional funding from the international parent bank in case their local profitable lending opportunities expand. Thus, with a more elastic supply of funds, foreign banks may be able to expand their lending relatively more during economic upswings. To test this, we re-estimate regressions 1 and 2 of

Table 2 after including a foreign bank variable and its interaction with GDP per capita growth. The results are reported as regressions 1 and 2 of Table 5. In the two regressions, the interaction of GDP per capita growth and the foreign bank variable obtains coefficients of 0.009 and 0.008 that are significant at 1%, implying that lending by private, foreign banks is more procyclical than lending by private, domestic banks. In both regressions, the interaction of the GDP per capita variable and the state bank variable obtains a coefficient of -0.008 that are significant at 5%, indicating that lending by state banks is less procyclical than for private, domestic banks. Regressions 3 and 5 include interactions of the GDP per capita variable with alternatively the state bank, domestic bank, and foreign bank variables. In both regressions, the three interaction terms are estimated with coefficients with significance of at least 10%. Estimated coefficients confirm increasing procyclicality of lending from state banks to private, domestic banks, and to private, foreign banks. Specifically, a 1% increase in GDP per capita growth leads to a credit supply growth of 0.5-0.6% for state bank, 1.1-1.2% for private, domestic banks and 2.1-2.2% for private foreign banks.

Next, we consider whether the relative procylicality of lending by state banks depends on the level of economic development. In particular, we estimate regressions 1-4 of Table 2 separately for the samples of high-income countries and developing countries (and emerging markets), using the World Bank classification. The results are reported in Table 6. In the high-income countries regressions 1 and 2, the interaction of GDP per capita and the state bank variable is estimated with negative and significant coefficients.[9] Interestingly, point estimates suggest that

[9] Similarly, Iannotta et al. (2011, Table 6) report that credit growth at state banks in Western Europe over the 2000-2009 period is relatively less procyclical, although this effect is not statistically significant. The difference in results could reflect a difference in sample size : 976 banks and 3439 observations in our high-income sample in regression 1 of Table 6, and 210 banks and 1541 observations in Iannotta et al. (2011). A further difference is that we define state banks as majority state-owned, while Iannotta et al. (2011) alternatively consider any and at least 20% state ownership.

credit in high income countries is procyclical for private bank, and countercyclical for state banks. Specifically, a 1% increase in GDP per capita growth is estimated to lead to a 1.3% increase in lending by private banks, and a 0.4% decrease in lending by state banks. Regressions 3 and 4 have similar implications, although the coefficients for the interaction of GDP per capita growth and the state bank dummy are marginally insignificant. In regressions 5-8 for the sample of developing countries, the interactions of GDP per capita growth and the state bank dummy obtain negative coefficients in the range from -0.011 to -0.008. Parameter estimates imply that credit by state banks is procyclical, but less so than for private banks. Throughout, the government effectiveness variable and the triple interaction of this variable with GDP per capita growth and the state bank variable are estimated with insignificant coefficients. Thus, variation in government effectiveness within the samples of high income countries and developing countries does not appear to affect the procylicality of lending by state banks, even if is it shown to affect this procyclicality in the pooled sample in Table 2.

Banking crises may lead to a scarcity of bank credit. Thus, the stabilization of credit by state banks is potentially most useful during a banking crisis. To conclude this section, we consider how relative lending by state banks and its degree of procylicality vary over crisis and non-crisis periods. To start, regressions 1-4 of Table 7 include a banking crisis variable, and its interactions with the state bank variable and jointly GDP per capita growth and the state banking variable in regressions 1-4 of Table 2. These additional variables are statistically insignificant in the 4 regressions. Hence, we cannot detect a different degree of procylicality of credit by state banks during crisis and non-crisis periods. Alternatively, regressions 5-8 include these additional variables, but delete the interaction of GDP per capita growth and the state bank variable, and the triple interaction of these two variables with the government effectiveness variable. The resulting

regressions test how credit growth of private and state banks is different during crisis and non-crisis periods. The banking crisis variable itself enters with a negative coefficient of -0.020 that is significant at 10% in regression 8, providing some evidence that lending by private banks is lower during banking crises. The interaction terms of the banking crisis variable and the state bank variable obtains coefficients in the range 0.123-0.155 with significance of at least 10%, implying that credit growth of state banks during a banking crisis is higher than for private banks. Estimates of coefficients suggest that the growth rate of loans provided by of state banks is positive during banking crises, counterbalancing any negative growth in the credit supply of private banks.

4. Conclusion

This paper finds that lending by state banks is less procyclical than the lending by private banks, especially if the bank is located in a country with good governance, as proxied by indicators of government effectiveness. Moreover, lending by state banks in high income countries is even countercyclical. Among private banks, we find that foreign-owned banks' lending is especially procyclical, perhaps because these banks have ready access to funding from their international parent firms to take advantage of local lending opportunities during economic upswings. State banks also expand their credit relatively more during banking crises, which suggests a stabilizing influence of state banks at a time of financial instability.

On the liability side, state banks expand their non-deposit liabilities relatively little during booms, especially if these banks are located in countries with good governance. In contrast, the relative increase in non-deposit liabilities of private banks during economic booms puts these banks at some risk, as this type of funding may be less stable than funding through deposits.

Public banks report relatively high additional non-performing loans during economic upswings. This may reflect either that the relative loan quality of state banks deteriorates during expansions (improves during economic downturns), or that state banks report loan non-performance more evenly over the business cycle. Overall our results suggest that state banks can play a useful role in stabilizing credit over the business cycle as well as during periods of financial instability. However, the track record of state banks in credit allocation remains quite poor, questioning the wisdom of using state banks as a short term counter-cyclical tool. Furthermore, an important question is whether this credit expansion during the downturn is the result of lending to the most constrained borrowers, such as small and medium enterprises or to larger politically favored enterprises. Another issue is whether state bank lending retrenches after crises consistent with the spirit of counter-cyclical lending. We leave these questions for further research.

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Appendix.

Table A1. Countries, average state ownership and number of banks

Average state ownership is average yearly ratio of total assets of state bank to total assets of all banks.

Country name	Income group	Average state ownership	Number of banks	Country name	Income group	Average state ownership	Number of banks	Country name	Income group	Average state ownership	Number of banks
Albania	Developing	0	2	Germany	High income	0.142	59	Norway	High income	0	11
Antigua and Barbuda	Developing	0	1	Ghana	Developing	0.154	4	Pakistan	Developing	0.641	12
Argentina	Developing	0.426	19	Greece	High income	0.278	8	Panama	Developing	0	21
Armenia	Developing	0	3	Guatemala	Developing	0	2	Peru	Developing	0	3
Australia	High income	0	28	Haiti	Developing	0	2	Philippines	Developing	0.635	9
Austria	High income	0.088	29	Honduras	Developing	0	1	Poland	Developing	0.177	19
Azerbaijan	Developing	0.758	5	Hong Kong	High income	0.070	24	Portugal	High income	0.187	23
Bahrain	Developing	0	2	Hungary	Developing	0.007	17	Qatar	High Income	0	2
Bangladesh	Developing	0	2	Iceland	High income	0.068	2	Romania	Developing	0.102	11
Barbados	Developing	0.097	4	India	Developing	0.998	15	Russian Federation	Developing	0.722	46
Belarus	Developing	0.790	8	Indonesia	Developing	0.712	14	Saudi Arabia	High income	0.240	9
Belgium	High income	0	19	Ireland	High income	0.063	19	Senegal	Developing	0	1
Bosnia-Herzegovina	Developing	0	1	Israel	High income	0.121	10	Singapore	High income	0	3
Botswana	Developing	0	3	Italy	High income	0	41	Slovakia	Developing	0.078	10
Brazil	Developing	0.410	58	Jamaica	Developing	0	7	Slovenia	High income	0.482	4
Bulgaria	Developing	0.030	7	Japan	High income	0.118	48	South Africa	Developing	0.033	21
Burundi	Developing	0	1	Jordan	Developing	0	5	Spain	High Income	0.004	14
Cambodia	Developing	0	1	Kazakhstan	Developing	0.100	10	Sri Lanka	Developing	0.963	6
Canada	High income	0	36	Kenya	Developing	0	10	Swaziland	Developing	0	1
Chile	Developing	0.154	17	Korea, Republic Of	Developing	0.529	14	Sweden	High income	0.084	12
China, People's Republic	Developing	0.992	9	Kuwait	High income	0	2	Switzerland	High income	0.001	32
Colombia	Developing	0	5	Latvia	Developing	0.065	15	Tanzania	Developing	0	1
Costa Rica	Developing	0.682	7	Lebanon	Developing	0	12	Thailand	Developing	0.708	10
Croatia	Developing	0	7	Lithuania	Developing	0.011	8	Trinidad and Tobago	Developing	0.397	6
Cuba	Developing	1	1	Luxembourg	High income	0.066	14	Tunisia	Developing	0	5
Cyprus	High income	0	8	Malawi	Developing	0	1	Turkey	Developing	0.466	27
Czech Republic	Developing	0.028	9	Malaysia	Developing	0.005	28	Uganda	Developing	0	5
Denmark	High income	0.001	13	Mauritius	Developing	0.121	2	Ukraine	Developing	0.079	16
Dominican Republic	Developing	0	2	Mexico	Developing	0	24	United Arab Emirates	High income	0.752	14
Ecuador	Developing	0	3	Moldova	Developing	1	1	United Kingdom	High income	0.105	79
Egypt	Developing	0.297	3	Morocco	Developing	0	3	United States	High income	0	252
El Salvador	Developing	0	5	Mozambique	Developing	0	2	Uruguay	Developing	0	1
Estonia	Developing	0.004	4	Namibia	Developing	0	4	Uzbekistan	Developing	0.937	3
Ethiopia	Developing	1	1	Netherlands	High income	0.197	37	Venezuela	Developing	0.093	5
Finland	High income	0.025	7	New Zealand	High income	0.019	7	Vietnam	Developing	0.944	5
France	High income	0.097	110	Nicaragua	Developing	0	1	Zambia	Developing	0	3
Georgia	Developing	0	7	Nigeria	Developing	0.003	10	Zimbabwe	Developing	0	1

Table A2. Variable definitions and data sources

Variable	Description	Sources
Loans	Log of net loans over GDP deflator	Bankscope and WDI
Liabilities	Log of liabilities over GDP deflator	Bankscope and WDI
Deposits	Log of deposits over GDP deflator	Bankscope and WDI
Non-deposit liabilities	Log of non-deposit liabilities over GDP deflator	Bankscope and WDI
Short-term funding	Log of short-term funding including deposits over GDP deflator	Bankscope and WDI
Long-term liabilities	Log of long-term liabilities over GDP deflator	Bankscope and WDI
Equity	Log of equity over GDP deflator	Bankscope and WDI
Net interest expense ratio	Log (interest expense over interest-bearing liabilities net of government T-Bill rate +1)	Bankscope, WDI and IMF IFS
Loan loss provisioning	Log (loan loss provisions over net loans + 1)	Bankscope and WDI
Non-performing loans	Log (non-performing loans over gross loans + 1)	Bankscope
State bank	Dummy variable that equals 1 if a bank is state-owned with a majority share, and zero otherwise	Bankscope, Banker's Almanac and various sources
Domestic bank	Dummy variable that equals 1 if a bank is domestically owned and not state-owned with a majority share, and zero otherwise	Bankscope
Foreign bank	Dummy variable that equals 1 if a bank is foreign-owned and not state-owned with a majority share, and zero otherwise	Bankscope
Government effectiveness	An index capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies	WGI
Assets*	Log of total assets in constant 2000 US dollars	Bankscope and WDI
Equity over assets*	Equity over total assets	Bankscope and WDI
Loans over assets*	Net loans over total assets	Bankscope
Liquidity*	Liquid assets over total assets	Bankscope
Deposits*	Total deposits over total Liabilities	Bankscope
Cooperative bank	Dummy variable that equals 1 if a bank is a cooperative bank, and zero otherwise	Bankscope
Real estate and mortgage bank	Dummy variable that equals 1 if a bank is a real estate or mortgage bank, and zero otherwise	Bankscope
Savings bank	Dummy variable that equals 1 if a bank is a savings bank, and zero otherwise	Bankscope
GDP per capita	GDP per capita in thousands of constant 2000 US dollars	WDI
GDP per capita growth	Rate of real per capita GDP growth in percentages	WDI
Inflation	Rate of change in GDP deflator in percentages	WDI
Banking crisis	Dummy variable that equals 1 if the country is in a banking crisis, and zero otherwise	Laeven and Valencia (2010)

*These variables are lagged in panel GMM regressions

Table 1. Summary statistics

Loans is log of net loans over GDP deflator. *Liabilities* is log of total liabilities over GDP deflator. *Deposits* is log of deposits over GDP deflator. *Non-deposit liabilities* is log of non-deposit liabilities over GDP deflator. *Short-term funding* is log of deposits and short-term funding over GDP deflator. *Long-term liabilities* is log of total liabilities minus short-term funding over GDP deflator. *Equity* is log of equity over GDP deflator. *Net interest expense ratio* is interest expenses over total interest-bearing liabilities minus government T-Bill rate. *Loans loss provisioning* is log of loan loss provisions over net loan ratio plus one. *Non-performing loans* is log of non-performing loans over gross loans plus one. *State bank, Domestic bank* and *Foreign* bank are dummy variables that equals 1 if a bank is state-owned, domestically and privately owned or foreign-owned and privately owned with a majority share. *Government effectiveness* is an index capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *Assets* is log of total assets in constant 2000 US dollars. *Equity over assets* is equity over total assets. *Loans over assets* is net loans over total assets. *Liquidity* is liquid assets over total assets. *Deposits over liabilities* is total deposits over total liabilities. *Cooperative bank, Real estate and mortgage bank* and *Saving bank* are dummies equaling 1 if a bank is of the implied type. *GDP per capita* is GDP per capita in thousands of constant 2000 US dollars. *GDP per capita growth* is the rate of real per capita GDP growth. *Inflation* is the rate of change in GDP deflator. *Banking crisis* is a dummy variable that equals 1 if the country is in a banking crisis.

Variable	Obs	Mean	Std. dev.	Min	Max
Loans	6181	22.460	3.072	11.344	32.868
Liabilities	6181	23.089	2.977	14.157	33.128
Deposits	6082	22.753	3.023	9.707	32.704
Non-deposit liabilities	6090	21.105	3.286	10.819	32.178
Short-term funding	6151	22.864	2.995	14.093	32.817
Long-term liabilities	6153	20.780	3.299	10.819	32.051
Equity	6172	20.769	2.777	13.751	30.521
Net interest expense ratio	4247	-0.016	0.089	-3.035	0.468
Loan loss provisioning	5913	0.013	0.031	-0.524	0.604
Non-performing loans	3991	0.048	0.061	0	0.647
State bank	6181	0.114	0.318	0	1
Domestic bank	6181	0.528	0.499	0	1
Foreign Bank	6081	0.358	0.480	0	1
Government effectiveness	5218	0.888	0.879	-1.645	2.374
Assets	6181	21.914	1.921	13.096	27.816
Equity over assets	6181	0.106	0.090	0.000	0.974
Loans over assets	6081	0.540	0.218	0.001	0.999
Liquidity	6081	0.239	0.191	0.000	0.978
Deposits over liabilities	6081	0.771	0.222	0.000	1
Cooperative bank	6081	0.024	0.152	0	1
Real estate and mortgage bank	6081	0.025	0.156	0	1
Savings bank	6081	0.035	0.183	0	1
GDP per capita	6181	17.763	13.898	0.109	56.389
GDP per capita growth	6181	1.960	3.983	-17.545	33.030
Inflation	6181	4.988	7.000	-24.758	185.291
Bank crisis	6181	0.182	0.386	0	1

Table 2. The determinants of bank lending

The dependent variable is *Loans,* which is log of net loans over GDP deflator. *GDP per capita growth* is the rate of real per capita GDP growth. *State bank* is a dummy variable that equals 1 if a bank is state-owned with a majority share. *Government effectiveness* is an index capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *Assets* is log of total assets in constant 2000 US dollars. *Equity over assets* is equity over total assets. *Loans over assets* is net loans over total assets. *Liquidity* is liquid assets over total assets. *Deposits over liabilities* is total deposits over total liabilities. *Cooperative bank, real estate and mortgage bank* and *saving bank* are dummies equaling 1 if a bank is that type. *GDP per capita* is GDP per capita in thousands of constant 2000 US dollars. *Inflation* is the rate of change in GDP deflator. We estimate all regressions using two-step system GMM estimation with Windmeijer correction (2005). The p-values for robust standard errors are given in parentheses.*, ** and *** denote significance at 10%, 5% and 1%.

	(1)	(2)	(3)	(4)
	Loans	Loans	Loans	Loans
Lagged loans	1.002***	0.998***	0.994***	0.991***
	(0.000)	(0.000)	(0.000)	(0.000)
GDP per capita growth	0.020***	0.020***	0.017***	0.017***
	(0.000)	(0.000)	(0.000)	(0.000)
State bank	0.047**	0.054**	0.053***	0.059***
	(0.022)	(0.037)	(0.006)	(0.002)
GDP per capita growth * State bank	-0.013***	-0.014***	-0.011***	-0.011***
	(0.000)	(0.000)	(0.000)	(0.001)
Government effectiveness			-0.050	-0.048
			(0.120)	(0.161)
GDP per capita growth * State bank dummy * Government effectiveness			-0.005**	-0.004
			(0.027)	(0.105)
Assets	-0.007	-0.003	-0.001	0.001
	(0.508)	(0.806)	(0.947)	(0.869)
Equity over assets	0.069	0.040	-0.018	-0.034
	(0.350)	(0.778)	(0.797)	(0.658)
Loans over assets		-0.080		-0.055
		(0.375)		(0.115)
Liquidity		0.045		0.018
		(0.772)		(0.681)
Deposits over liabilities		0.041		0.025
		(0.453)		(0.278)
Cooperative bank		0.048**		0.053***
		(0.013)		(0.001)
Real estate and mortgage bank		0.012		0.013
		(0.583)		(0.545)
Savings bank		0.026		0.010
		(0.232)		(0.497)
GDP per capita	-0.001**	-0.001	0.001	0.001
	(0.022)	(0.369)	(0.618)	(0.642)
Inflation	-0.004***	-0.004***	-0.005***	-0.004***
	(0.000)	(0.010)	(0.000)	(0.000)
Constant	0.166***	0.152	0.181***	0.214***
	(0.003)	(0.275)	(0.001)	(0.005)
Number of observations	6181	6081	5218	5132

Number of banks	1633	1609	1506	1483
Number of instruments	272	278	352	358
Second order AR tests	0.508	0.611	0.933	0.841
Hansen OIR test p-value	0.200	0.269	0.818	0.847

Table 3. The determinants of bank sources and costs of funds

The dependent variables are *Liabilities*, *Deposits*, *Non-deposit liabilities, Short-term funding, Long-term liabilities, Equity* and *Net interest expense ratio*. *Liabilities* is log of total liabilities over GDP deflator. *Deposits* is log of deposits over GDP deflator. *Non-deposit liabilities* is log of non-deposit liabilities over GDP deflator. *Short-term funding* is log of short-term funding including deposits over GDP deflator. *Long-term liabilities* is log of total liabilities minus short-term funding over GDP deflator. *Equity* is log of equity over GDP deflator. *Net interest expense ratio* is log of interest expenses over total interest-bearing liabilities minus government T-Bill rate. *GDP per capita growth* is the rate of real per capita GDP growth. *State bank* is a dummy variable that equals 1 if a bank is state-owned with a majority share. *Government effectiveness* is an index capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *Assets* is log of total assets in constant 2000 US dollars. *Equity over assets* is equity over total assets. *Loans over assets* is net loans over total assets. *Liquidity* is liquid assets over total assets. *Deposits over liabilities* is total deposits over total liabilities. *Cooperative bank, real estate and mortgage bank* and *saving bank* are dummies equaling 1 if a bank is that type. *GDP per capita* is GDP per capita in thousands of constant 2000 US dollars. *Inflation* is the rate of change in GDP deflator. We estimate all regressions using two-step system GMM estimation with Windmeijer correction (2005). The p-values for robust standard errors are given in parentheses.*, ** and *** denote significance at 10%, 5% and 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
	Liabilities		Deposit		Non-deposit liabilities		Short-term funding		Long-term liabilities		Equity		Net interest expense ratio	
Lagged dependent variable	0.993***	1.000***	0.977***	0.985***	0.967***	0.984***	0.991***	0.995***	0.960***	0.969***	0.995***	1.001***	0.426***	0.404***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP per capita growth	0.015***	0.016***	0.014***	0.015***	0.026***	0.025***	0.012***	0.013***	0.022***	0.022***	0.009***	0.009***	0.001	0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)	(0.002)	(0.010)	(0.010)	(0.148)	(0.052)
State bank	0.041**	0.043**	0.056***	0.052**	0.090**	0.081**	0.044**	0.043**	0.093**	0.087**	0.026	0.028	0.013*	0.009
	(0.023)	(0.033)	(0.010)	(0.027)	(0.013)	(0.030)	(0.015)	(0.012)	(0.038)	(0.033)	(0.139)	(0.114)	(0.056)	(0.136)
GDP per capita growth * State bank	-0.007**	-0.008**	-0.006	-0.005	-0.018**	-0.020***	-0.006	-0.006*	-0.011	-0.013	-0.004	-0.004	-0.000	
	(0.039)	(0.020)	(0.120)	(0.166)	(0.018)	(0.006)	(0.146)	(0.099)	(0.190)	(0.115)	(0.336)	(0.359)	(0.932)	-0.000
Government effectiveness	0.002	-0.015	-0.071*	-0.088**	0.080	0.072	-0.022	-0.050	0.140*	0.106	-0.024	-0.022	-0.000	(0.597)
	(0.953)	(0.589)	(0.088)	(0.017)	(0.264)	(0.312)	(0.601)	(0.215)	(0.076)	(0.182)	(0.537)	(0.560)	(0.869)	
GDP per capita growth * State bank * Government effectiveness	-0.004	-0.003	0.006	0.003	-0.020***	-0.014*	0.001	-0.000	-0.011	-0.007	-0.007**	-0.008**	-0.001	-0.000
	(0.178)	(0.181)	(0.158)	(0.439)	(0.005)	(0.053)	(0.870)	(0.946)	(0.132)	(0.399)	(0.030)	(0.027)	(0.825)	(0.981)
Assets	-0.005	-0.008	0.015	-0.000	0.044**	0.043**	-0.002	-0.006	0.047**	0.046**	-0.007	-0.016*	0.001***	0.000
	(0.506)	(0.261)	(0.249)	(0.974)	(0.023)	(0.024)	(0.816)	(0.410)	(0.030)	(0.034)	(0.407)	(0.057)	(0.003)	(0.233)
Equity over assets	0.198*	0.318**	0.238	0.191	0.294*	0.739***	0.254**	0.340**	0.176	0.327*	-0.374***	-0.647***	-0.009	-0.031**
	(0.073)	(0.011)	(0.128)	(0.220)	(0.057)	(0.000)	(0.042)	(0.010)	(0.222)	(0.061)	(0.000)	(0.000)	(0.312)	(0.021)
Loans over assets		0.209***		0.200***		0.195***		0.196***		0.181**		0.100***		-0.009
		(0.000)		(0.000)		(0.008)		(0.000)		(0.012)		(0.003)		(0.175)
Liquidity		0.050		0.059		0.013		0.014		0.006		0.080*		-0.011
		(0.342)		(0.255)		(0.897)		(0.791)		(0.951)		(0.054)		(0.118)
Deposits over liabilities		0.035		-0.278***		0.473***		-0.073*		0.248***		-0.052**		-0.008*
		(0.196)		(0.000)		(0.000)		(0.066)		(0.000)		(0.040)		(0.070)
Cooperative bank		0.011		-0.001		0.040		0.003		-0.006		0.043**		0.003
		(0.491)		(0.987)		(0.360)		(0.905)		(0.888)		(0.026)		(0.229)
Real estate and mortgage bank		-0.014		-0.031		0.091		0.010		0.057		-0.053*		-0.003
		(0.609)		(0.419)		(0.172)		(0.813)		(0.365)		(0.094)		(0.565)
Savings bank		-0.013		-0.048*		0.036		-0.026		-0.017		0.002		0.001
		(0.336)		(0.074)		(0.444)		(0.186)		(0.669)		(0.905)		(0.700)
GDP per capita	-0.001	-0.000	0.001	0.002	-0.006*	-0.005	-0.000	0.001	-0.010***	-0.008**	-0.001	-0.000	-0.000	
	(0.320)	(0.800)	(0.533)	(0.174)	(0.064)	(0.127)	(0.920)	(0.564)	(0.006)	(0.036)	(0.646)	(0.810)	(0.548)	
Inflation	-0.004***	-0.005***	-0.007***	-0.008***	0.003	0.003	-0.005***	-0.006***	0.005*	0.005*	-0.003*	-0.003**	-0.001***	0.404***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.324)	(0.250)	(0.001)	(0.000)	(0.098)	(0.062)	(0.065)	(0.046)	(0.001)	(0.000)
Constant	0.270***	-0.008	0.204**	0.460***	-0.345**	-1.223***	0.226***	0.160	-0.258	-0.720***	0.375***	0.424***	-0.033***	-0.003
	(0.000)	(0.934)	(0.035)	(0.000)	(0.038)	(0.000)	(0.005)	(0.107)	(0.148)	(0.000)	(0.000)	(0.000)	(0.001)	(0.835)
Number of observations	5298	5140	5154	5122	5170	5128	5228	5133	5244	5136	5292	5134	3555	3442
Number of banks	1528	1486	1491	1481	1496	1483	1508	1482	1511	1484	1527	1485	1076	1045
Number of instruments	352	358	352	358	352	358	352	358	352	358	352	358	337	343
Second order AR tests	0.425	0.803	0.210	0.337	0.575	0.607	0.380	0.486	0.248	0.229	0.045	0.099	0.659	0.183
Hansen OIR test p-value	0.631	0.562	0.749	0.818	0.820	0.738	0.674	0.447	0.949	0.978	0.435	0.587	0.244	0.413

Table 4. The determinants of non-performing loans and loan loss provisioning

The dependent variables are *non-performing loans* , which is log of non-performing loans over gross loans plus one, in regressions 1-4 and *Loans loss provisioning,* which is log of loan loss provisions over net loan ratio plus one, in regressions 5-8. *GDP per capita growth* is the rate of real per capita GDP growth. *State bank* is a dummy variable that equals 1 if a bank is state-owned with a majority share. *Government effectiveness* is an index capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *Assets* is log of total assets in constant 2000 US dollars. *Equity over assets* is equity over total assets. *Loans over assets* is the net loans over total assets. *Liquidity* is liquid assets over total assets. *Deposits over liabilities* is total deposits over total liabilities. *Cooperative bank, real estate and mortgage bank* and *saving bank* are dummies equaling 1 if a bank is that type. *GDP per capita* is GDP per capita in thousands of constant 2000 US dollars. *Inflation* is the rate of change in GDP deflator. We estimate all regressions using two-step system GMM estimation with Windmeijer correction (2005). The p-values for robust standard errors are given in parentheses.*, ** and *** denote significance at 10%, 5% and 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Non-performing loans				Loan loss provisioning			
Lagged dependent variable	0.725***	0.744***	0.764***	0.793***	0.096	0.085	0.076	0.056
	(0.000)	(0.000)	(0.000)	(0.000)	(0.275)	(0.326)	(0.306)	(0.452)
GDP per capita growth	-0.003***	-0.003***	-0.003***	-0.003***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
State bank	0.002	0.001	-0.004	-0.004	0.000	0.000	-0.003	-0.002
	(0.773)	(0.891)	(0.427)	(0.361)	(0.933)	(0.982)	(0.297)	(0.389)
GDP per capita growth * State bank	0.002*	0.002*	0.002**	0.002**	0.001***	0.001***	0.001***	0.001**
	(0.054)	(0.060)	(0.045)	(0.032)	(0.001)	(0.003)	(0.002)	(0.012)
Government effectiveness			-0.004	-0.004			-0.010***	-0.010***
			(0.541)	(0.514)			(0.003)	(0.003)
GDP per capita growth * State bank * Government effectiveness			-0.000	-0.001			0.000	0.000
			(0.430)	(0.315)			(0.804)	(0.921)
Assets	-0.001	-0.001	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.149)	(0.256)	(0.742)	(0.655)	(0.221)	(0.284)	(0.961)	(0.979)
Equity over assets	0.002	0.001	0.013	0.002	0.005	0.002	0.004	0.005
	(0.905)	(0.968)	(0.407)	(0.903)	(0.626)	(0.850)	(0.728)	(0.701)
Loans over assets		0.009		0.017***		0.006		0.009**
		(0.145)		(0.001)		(0.199)		(0.026)
Liquidity		-0.002		0.002		-0.003		-0.002
		(0.687)		(0.732)		(0.434)		(0.619)
Deposits over liabilities		-0.001		-0.001		-0.006**		-0.007**
		(0.703)		(0.769)		(0.042)		(0.033)
Cooperative bank		-0.005		-0.004		-0.006***		-0.003
		(0.299)		(0.173)		(0.001)		(0.280)
Real estate and mortgage bank		-0.012***		-0.013***		-0.011***		-0.007**
		(0.000)		(0.001)		(0.000)		(0.037)
Savings bank		-0.003		-0.004		-0.004***		-0.004*
		(0.144)		(0.214)		(0.009)		(0.078)
GDP per capita	-0.000***	-0.000***	-0.000	-0.000	-0.000***	-0.000***	0.000	0.000
	(0.000)	(0.000)	(0.499)	(0.583)	(0.000)	(0.000)	(0.696)	(0.693)
Inflation	-0.000	-0.000	-0.000	-0.000	0.000***	0.000**	0.000	0.000
	(0.510)	(0.557)	(0.597)	(0.711)	(0.005)	(0.021)	(0.948)	(0.814)
Constant	0.048***	0.042**	0.033**	0.024	0.096	0.085	0.027***	0.027**
	(0.003)	(0.040)	(0.040)	(0.139)	(0.275)	(0.326)	(0.010)	(0.024)

Number of observations	3991	3941	3503	3453	5855	5773	4965	4891
Number of banks	1174	1162	1104	1092	1560	1541	1442	1425
Number of instruments	270	276	347	352	272	278	350	355
Second order AR tests	0.588	0.602	0.905	0.903	0.603	0.600	0.287	0.301
Hansen OIR test p-value	0.112	0.166	0.658	0.701	0.090	0.104	0.056	0.175

Table 5. The determinants of bank loans including foreign bank ownership

The dependent variable is *Loans,* which is log of net loans over GDP deflator. *GDP per capita growth* is the rate of real per capita GDP growth. *State bank, Domestic bank* and *Foreign bank* are dummy variables that equals 1 if a bank is state-owned, domestically and privately owned or foreign-owned and privately owned with a majority share. *Assets* is log of total assets in constant 2000 US dollars. *Equity over assets* is equity over total assets. *Loans over assets* is net loans over total assets. *Liquidity* is liquid assets over total assets. *Deposits over liabilities* is total deposits over total liabilities. *Cooperative bank, real estate and mortgage bank* and *saving bank* are dummies equaling 1 if a bank is that type. *GDP per capita* is GDP per capita in thousands of constant 2000 US dollars. *Inflation* is the rate of change in GDP deflator. We estimate all regressions using two-step system GMM estimation with Windmeijer correction (2005). The p-values for robust standard errors are given in parentheses.*, ** and *** denote significance at 10%, 5% and 1%.

	(1)	(2)	(3)	(4)
	Loans	Loans	Loans	Loans
Lagged loans	0.998***	0.996***	0.994***	0.995***
	(0.000)	(0.000)	(0.000)	(0.000)
GDP per capita growth	0.013***	0.014***		
	(0.000)	(0.000)		
State bank	0.041*	0.044**	0.869***	0.357
	(0.055)	(0.031)	(0.000)	(0.270)
Domestic bank			0.816***	0.309
			(0.001)	(0.332)
Foreign bank	-0.035**	-0.039***	0.767***	0.266
	(0.012)	(0.007)	(0.001)	(0.404)
GDP per capita growth * State bank	-0.008**	-0.008**	0.005*	0.006**
	(0.039)	(0.016)	(0.092)	(0.031)
GDP per capita growth * Domestic bank			0.011***	0.012***
			(0.001)	(0.000)
GDP per capita growth * Foreign bank	0.009***	0.008***	0.021***	0.022***
	(0.002)	(0.004)	(0.000)	(0.000)
Assets	-0.005	-0.002	-0.024*	-0.005
	(0.606)	(0.778)	(0.057)	(0.691)
Equity over assets	0.067	0.033	-0.207	-0.003
	(0.343)	(0.680)	(0.107)	(0.986)
Loans over assets		-0.076**		-0.080*
		(0.012)		(0.068)
Liquidity		0.043		0.031
		(0.244)		(0.559)
Deposits over liabilities		0.048**		0.034
		(0.032)		(0.361)
Cooperative bank		0.033**		0.031**
		(0.022)		(0.028)
Real estate and mortgage bank		0.011		0.009
		(0.471)		(0.565)
Savings bank		0.019		0.017
		(0.162)		(0.203)
GDP per capita	-0.002***	-0.002**	-0.002***	-0.002***
	(0.001)	(0.012)	(0.001)	(0.006)
Inflation	-0.004***	-0.004***	-0.005***	-0.004***
	(0.000)	(0.000)	(0.000)	(0.000)
Number of observations	6181	6081	6181	6081
Number of banks	1633	1609	1633	1609
Number of instruments	401	407	455	461
Second order AR tests	0.490	0.611	0.513	0.618
Hansen OIR test p-value	0.373	0.452	0.474	0.510

Table 6. Bank loans in high income countries and developing countries

The dependent variable is *Loans,* which is log of net loans over GDP deflator. *GDP per capita growth* is the rate of real per capita GDP growth. *State bank* is a dummy variable that equals 1 if a bank is state-owned with a majority share. *Government effectiveness* is an index capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *Assets* is the natural logarithm of total assets in constant 2000 US dollars. *Equity over assets* is equity over total assets. *Loans over assets* is the share of net loans over total assets. *Liquidity* is liquid assets over total assets. *Deposits over liabilities* is total deposits over total liabilities. *Cooperative bank, real estate & mortgage bank* and *saving bank* are dummies equaling 1 if a bank is that type. *GDP per capita* is GDP per capita in thousands of constant 2000 US dollars. *Inflation* is the rate of change in GDP deflator. Regressions 1-4 are for sample of high income countries, and regressions 5-8 are for developing and emerging countries. We estimate all regressions using two-step system GMM estimation with Windmeijer correction (2005). The p-values for robust standard errors are given in parentheses.*, ** and *** denote significance at 10%, 5% and 1%.

	High income countries				Developing and emerging markets			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Loans	Loans	Loans	Loans	Loans	Loans	Loans	Loans
Lagged loans	1.002***	0.991***	0.988***	0.982***	0.993***	0.994***	0.995***	0.997***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP per capita growth	0.013***	0.013**	0.008*	0.009*	0.021***	0.021***	0.020***	0.020***
	(0.008)	(0.014)	(0.069)	(0.078)	(0.000)	(0.000)	(0.000)	(0.000)
GDP per capita growth * State bank	-0.017***	-0.017***	-0.015	-0.018	-0.011***	-0.011***	-0.008***	-0.009***
	(0.000)	(0.000)	(0.114)	(0.128)	(0.001)	(0.001)	(0.005)	(0.004)
State bank	0.048**	0.063***	0.056***	0.061***	0.056**	0.052*	0.059***	0.065***
	(0.036)	(0.002)	(0.006)	(0.004)	(0.041)	(0.056)	(0.007)	(0.005)
Government effectiveness			-0.040	-0.041			-0.020	0.004
			(0.109)	(0.131)			(0.547)	(0.916)
GDP per capita growth * State bank * Government effectiveness			0.000	0.003			-0.004	-0.003
			(0.946)	(0.680)			(0.245)	(0.457)
Assets	-0.006	0.008	0.008	0.016	-0.001	-0.001	-0.006	-0.008
	(0.673)	(0.668)	(0.433)	(0.188)	(0.923)	(0.908)	(0.477)	(0.342)
Equity over assets	-0.007	-0.014	-0.093	-0.091	0.168	0.166	0.031	0.072
	(0.930)	(0.860)	(0.252)	(0.284)	(0.127)	(0.273)	(0.736)	(0.572)
Loans over assets		0.004		0.001		-0.175***		-0.138***
		(0.956)		(0.987)		(0.000)		(0.008)
Liquidity		0.032		0.020		0.056		0.074
		(0.465)		(0.680)		(0.292)		(0.185)
Deposits over liabilities		0.055*		0.042		0.026		0.024
		(0.076)		(0.173)		(0.505)		(0.501)
Cooperative bank		0.030**		0.027**		0.103***		0.105**
		(0.031)		(0.027)		(0.002)		(0.011)
Real estate and mortgage bank		0.008		0.021		0.000		-0.006
		(0.696)		(0.415)		(0.994)		(0.819)
Savings bank		0.014		-0.001		0.022		0.020
		(0.366)		(0.923)		(0.523)		(0.631)
GDP per capita	-0.002**	-0.001	-0.000	0.000	-0.006***	-0.005*	-0.001	-0.003
	(0.016)	(0.136)	(0.723)	(0.937)	(0.009)	(0.052)	(0.795)	(0.527)
Inflation	-0.000	-0.001	-0.000	-0.000	-0.005***	-0.005***	-0.006***	-0.005***
	(0.775)	(0.625)	(0.984)	(0.972)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.157**	0.025	0.156**	0.062	0.232***	0.248**	0.273***	0.311**

	(0.028)	(0.861)	(0.040)	(0.655)	(0.006)	(0.020)	(0.005)	(0.011)
Number of observations	3439	3374	2889	2831	2742	2707	2329	2301
Number of banks	976	957	886	868	657	652	620	615
Number of instruments	221	227	271	277	269	275	344	350
Second order AR tests	0.994	0.997	0.365	0.341	0.314	0.397	0.464	0.534
Hansen OIR test p-value	0.898	0.916	0.967	0.958	0.846	0.665	0.993	0.983

Table 7. Bank lending during banking crises

The dependent variable is *Loans,* which is log of net loans over GDP deflator. *GDP per capita growth* is the rate of real per capita GDP growth. *State bank* is a dummy variable that equals 1 if a bank is state-owned with a majority share. *Government effectiveness* is an index capturing perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. *Banking crisis* is a dummy variable that equals 1 if the country is in a banking crisis. *Assets* is log of total assets in constant 2000 US dollars. *Equity over assets* is equity over total assets. *Loans over assets* is net loans over total assets. *Liquidity* is liquid assets over total assets. *Deposits over liabilities* is total deposits over total liabilities. *Cooperative bank, real estate and mortgage bank* and *saving bank* are dummies equaling 1 if a bank is that type. *GDP per capita* is GDP per capita in thousands of constant 2000 US dollars. *Inflation* is the rate of change in GDP deflator. We estimate all regressions using two-step system GMM estimation with Windmeijer correction (2005). The p-values for robust standard errors are given in parentheses.*, ** and *** denote significance at 10%, 5% and 1%.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Lagged loans	1.005***	1.000***	0.996***	0.994***	1.003***	0.996***	0.997***	0.993***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP per capita growth	0.019***	0.020***	0.017***	0.018***	0.018***	0.019***	0.016***	0.016***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
State bank	0.042	0.047*	0.042	0.051*	-0.038	-0.028	-0.022	-0.021
	(0.108)	(0.057)	(0.112)	(0.053)	(0.457)	(0.586)	(0.621)	(0.650)
GDP per capita growth * State bank	-0.013***	-0.013***	-0.010***	-0.010***				
	(0.000)	(0.000)	(0.005)	(0.002)				
Government effectiveness			-0.056*	-0.051			-0.054	-0.043
			(0.079)	(0.129)			(0.113)	(0.239)
GDP per capita growth * State bank * Government effectiveness			-0.005*	-0.004				
			(0.088)	(0.123)				
Banking crisis	-0.005	-0.008	-0.012	-0.015	-0.014	-0.017	-0.016	-0.020*
	(0.695)	(0.526)	(0.269)	(0.185)	(0.292)	(0.169)	(0.148)	(0.065)
Banking crisis * State bank	0.020	0.014	0.026	0.016	0.155***	0.142***	0.123*	0.129*
	(0.626)	(0.717)	(0.518)	(0.717)	(0.004)	(0.007)	(0.080)	(0.079)
Banking crisis * State bank * Government effectiveness							0.006	-0.001
							(0.891)	(0.980)
Assets	-0.011	-0.006	-0.003	-0.001	-0.007	0.000	-0.003	0.001
	(0.287)	(0.498)	(0.716)	(0.936)	(0.612)	(0.996)	(0.742)	(0.896)
Equity	0.085	0.048	-0.003	0.019	0.076	0.047	0.009	0.001
	(0.231)	(0.537)	(0.969)	(0.808)	(0.336)	(0.553)	(0.896)	(0.986)
Loans over assets		-0.081**		-0.062*		-0.063*		-0.058*
		(0.015)		(0.083)		(0.068)		(0.078)
Liquidity		0.054		0.025		0.038		0.020
		(0.152)		(0.557)		(0.405)		(0.661)
Deposits over liabilities		0.040*		0.025		0.042		0.027
		(0.089)		(0.244)		(0.124)		(0.226)
Cooperative bank		0.052***		0.057***		0.046***		0.051***
		(0.000)		(0.000)		(0.004)		(0.002)
Real estate and mortgage bank		0.014		0.015		0.007		0.014
		(0.352)		(0.518)		(0.659)		(0.514)
Savings bank		0.027**		0.010		0.021		0.010
		(0.038)		(0.473)		(0.102)		(0.470)
GDP per capita	-0.001**	-0.001*	0.001	0.001	-0.001*	-0.001	0.001	0.000
	(0.031)	(0.082)	(0.405)	(0.479)	(0.097)	(0.111)	(0.617)	(0.829)

Inflation	-0.004***	-0.004***	-0.005***	-0.005***	-0.005***	-0.004***	-0.005***	-0.005***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.174***	0.157**	0.195***	0.203***	0.147**	0.122*	0.173***	0.178**
	(0.004)	(0.024)	(0.001)	(0.007)	(0.015)	(0.097)	(0.004)	(0.016)
Number of observations	6181	6081	5218	5132	6181	6081	5218	5132
Number of banks	1633	1609	1506	1483	1633	1609	1506	1483
Number of instruments	299	305	376	382	234	240	277	283
Second order AR tests	0.509	0.620	0.908	0.832	0.543	0.674	0.880	0.778
Hansen OIR test p-value	0.584	0.631	0.952	0.973	0.148	0.137	0.302	0.294

Figure 1. Average share of assets owned by state-owned banks

The figure show the yearly average share of bank assets owned by state-owned banks, computed as a weighted average of individual country shares with the weights reflecting the number of observations in individual countries over the 1999-2010 period. The three lines present all countries, high income countries, and developing countries and emerging markets.